Life Cycle Analysis Game

Curriculum:
This resource can be used as a learning or revision tool for the topic of life cycle assessment/analysis. This resource maps directly to the GCSE curriculum for AQA, Edexcel, and OCR boards. This resource may also be interesting and useful for A-Level classes as a revision of the topic and sustainability and plastic.

Aim:
To inform students on the process of life cycle analysis in a fun and engaging way.

Objectives:
Consider the many different aspects of the production of fizzy drinks

Apply a life cycle analysis to 3 packaging options

Determine which option has the lowest impact

Broaden understanding of why plastic is the current choice despite problems

How this resource can be used:

This resource can be used as a full lesson on life cycle analysis, or the game can be used as a part of another lesson at the teacher discretion. It can be used in groups or as a whole class at the teachers’ discretion.

1) Group activity (50 minutes total):

Starter (5 minutes):
Introduce the topic of life cycle analysis and different aspects that are important to consider: packaging, waste, transport etc.

Activity (40 minutes):

Hypothesis

Ask students to make a hypothesis with reasoning as to which of the 3 fizzy dink packagings has the lowest impact on the environment.

Game

Split the class into groups of 3, each student is given a set of cards corresponding to a type of packaging (glass, can, plastic).

The aim of the game is to have the lowest Global Warming Potential overall.

In a loosely “Top Trumps” style of gameplay, player 1 may select “Retail” as the 1st card played. The other 2 players must then also present their “Retail” cards. The group note all of the GWPs on the score sheet. The player that had the lowest GWP then selects the next card played and the game continues. Once all cards have been played students add up the total GWPs on the score card and find out who the winner is, with the LOWEST score.

\*As an additional element to the game, before revealing the GWP of each card they students may compete to see who can guess correctly which packaging has the lowest GWP by reading out some of the blurb on the card.\*



Discussion (5 minutes):
To conclude, ask the students if their hypothesis was correct. Highlight the importance of looking at the whole picture. Discuss as a class what the best way to lower our environmental impact e.g. recycle more, consume less.

2) Whole class activity (30 minutes)

Starter (5 minutes):
Introduce the topic of life cycle analysis and different aspects that are important to consider: packaging, waste, transport etc.

Activity (20 minutes):

Hypothesis

As a class make a hypothesis with reasoning as to which of the 3 fizzy dink packagings has the lowest impact on the environment.

Game

Distribute the 15 cards throughout the class and assign someone to keep score.

The aim of the game is to have the lowest Global Warming Potential overall.

Progress through the cards in any order asking the student with the card to read the burb on their card and give their GWP score. Once all cards have been played students add up the total GWPs on the score card and find out who the winner is, with the LOWEST score.

Discussion (5 minutes):
To conclude, ask the students if their hypothesis was correct. Highlight the importance of looking at the whole picture. Discuss as a class what the best way to lower our environmental impact e.g. recycle more, consume less.

Extension:

As homework, ask the students to write a short piece on whether they think plastic bottles would have a higher or lower environmental impact if they were made from renewable resources like sugar cane or corn husks. The students are not expected to give research or evidence-based answers but should think about the questions on the final slide and the bigger picture when forming their opinion/ doing their analysis.

Questions for reflection:

What is the best thing they could do to lower their environmental impact?

Have their opinions changed with regards to using plastic?

Feedback:
We are constantly looking for ways to improve these resources and would be very grateful if the teacher giving the lesson and the students involved with the activity, could provide feedback. The links can be accessed on a computer or a smartphone.



Teacher feedback:
<https://forms.office.com/Pages/ResponsePage.aspx?id=7qe9Z4D970GskTWEGCkKHhIKjMLK9DlHk3LxaBgd4N1UNU5LN1lWSTNBTjlOTUY0TjVDOUM1SkYxRS4u>

Or

<https://bit.ly/2PDG2e3>

Student feedback:
<https://forms.office.com/Pages/ResponsePage.aspx?id=7qe9Z4D970GskTWEGCkKHhIKjMLK9DlHk3LxaBgd4N1UMzJSMU1TVlg3N08zN0c4QTlNTFRGSDBNTy4u>

Or

<https://bit.ly/2UTx39f>

Data for this resource was obtained from the following paper:

D. Amienyo, H. Gujbah, H. Stichnothe, A. Azapagic, Life Cycle Environmental Impacts of Carbonated Soft Drinks. *Int. J. Life Cycle Assess.* **2013**, *18* (1), 77–92.